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Rev. 07/10/02

Five-Year Review Report

Second Five-Year Review Report

For

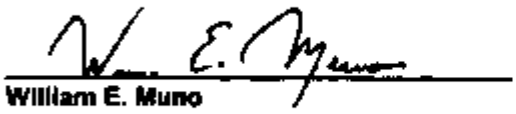
Wauconda Sand & Gravel Landfill
Wauconda, Illinois

August 2002

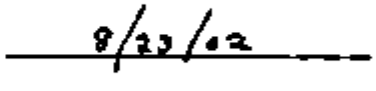
PREPARED BY:

United States Environmental Protection Agency
Region 5
Chicago, Illinois

Approved By: **Date:**



William E. Muno
Superfund Division Director
U.S. EPA, Region 5



Executive Summary

The remedy for the Wauconda Sand & Gravel Landfill Superfund Site in Wauconda, Illinois included a leachate control system, gas control management system, landfill cap upgrades, groundwater monitoring, and institutional controls. The Site achieved construction completion with the signing of the Preliminary Close Out Report on August 22, 1996. The trigger for this five-year review was the start date of the remedial action in May 1992.

The assessment of this five-year review found that the remedy was constructed in accordance with the requirements of the interim and final Record of Decisions (RODs). The remedy is functioning as designed. The immediate threats have been addressed and the remedy is expected to be protective when all groundwater cleanup goals are achieved within the next 20 years.

Five-Year Review Summary Form

SITE IDENTIFICATION		
Site name *(from WasteLAN)*: Wauconda Sand & Gravel Landfill		
EPA ID *(from WasteLAN)*:		
Region: 5	**State:** IL	**City/County:** Lake County
SITE STATUS		
NPL status: ☒ Final ☐ Deleted ☐ Other (specify)		
Remediation status (choose all that apply): ☐ Under Construction ☐ Operating ☒ Complete		
Multiple Operable Units? ☒ YES ☐ NO	**Construction completion date:** 8 / 22/ 1996	
Has site been put into reuse? ☐ YES ☒ NO		
REVIEW STATUS		
Lead agency: ☒ EPA ☐ State ☐ Tribe ☐ Other Federal Agency		
Author name: L. Hill		
Author title: Remedial Project Manager	**Author affiliation:** U.S. EPA, Region 5	
Review period: 11 / 30 / 2001 to 6 / 1 / 2002		
Date(s) of site inspection: 3 / 21 / 2002		
Type of review: Post-SARA ☐ Pre-SARA ☐ NPL-Removal only ☐ Non-NPL Remedial Action Site ☐ NPL State/Tribe-lead ☒ Regional Discretion		
Review number: ☐ 1 (first) ☒ 2 (second) ☐ 3 (third) ☐ Other (specify)		
Triggering action: ☐ Actual RA On-site Construction at OU #__ ☒ Actual RA Start at Site ☐ Construction Completion ☐ Previous Five-Year Review Report ☐ Other (specify)		
Triggering action date *(from WasteLAN)*: 5/ 30 / 1992		
Due date *(ten years after triggering action date)*: 6 / 30 / 2002		

Five-Year Review Summary Form, cont'd.

Issues:

There are no significant issues surrounding the remedy at the Site.

Recommendations and Follow-up Actions:

The operations and maintenance activities should be continued for the leachate collection system, gas management system, and the landfill cap.

Groundwater monitoring and sampling should be continued for the Site.

U.S. EPA should conduct further investigations of the proposed installation of new municipal wells in the area and the impact on the Site.

Protectiveness Statement(s):

All immediate threats at the Site have been addressed, and the remedy is expected to be protective of human health and the environment after the groundwater cleanup goals are achieved within an estimated 20 years.

Long-term Protectiveness:

Long-term protectiveness of the remedial action will be verified by obtaining additional groundwater samples to fully evaluate potential migration of contaminants down gradient from the Site. Additional sampling and analysis will be completed within the next six months. Current monitoring data indicate that the remedy is functioning as required to achieve groundwater cleanup goals.

Other Comments:

There are no other issues which impact the protectiveness of the remedy.

Wauconda Sand & Gravel
Wauconda, Illinois

Second Five-Year Review Report

I. Introduction

The purpose of a five-year review is to determine whether the remedy at a site is protective of human health and the environment. The methods, findings, and conclusions of reviews are documented in five-year review reports. In addition, five-year review reports identify issues found during the review, if any, and identify recommendations to address them.

The Agency is preparing this Five-Year Review report pursuant to CERCLA §121 and the National Contingency Plan (NCP). CERCLA §121 states:

> *If the President selects a remedial action that results in any hazardous substances, pollutants, or contaminants remaining at the site, the President shall review such remedial action no less often than each five years after the initiation of such remedial action to assure that human health and the environment are being protected by the remedial action being implemented. In addition, if upon such review it is the judgment of the President that action is appropriate at such site in accordance with section [104] or [106], the President shall take or require such action. The President shall report to the Congress a list of facilities for which such review is required, the results of all such reviews, and any actions taken as a result of such reviews.*
>
> The Agency interpreted this requirement further in the NCP; 40 FR §300.430(f)(4)(ii) states:
>
> *If a remedial action is selected that results in hazardous substances, pollutants, or contaminants remaining at the site above levels that allow for unlimited use and unrestricted exposure, the lead agency shall review such action no less often than every five years after the initiation of the selected remedial action.*

The United States Environmental Protection Agency (U.S. EPA), Region 5, conducted the five-year review of the remedy implemented at the Wauconda Sand & Gravel Landfill Superfund Site in Wauconda, Illinois ("the Site"). This review was conducted by the Remedial Project Manager (RPM) for the Site from November 2001 through May 2002. The PRP contractor, Conestoga-Rovers, provided comments on the five-year review and participated in the inspection. This report documents the results of the review.

This is the second five-year review for the Site. The triggering action for this statutory review is the initiation of the remedial action on May 5, 1992. The five-year review is required due to the fact that hazardous substances, pollutants, or contaminants remain at the Site above levels that allow for unlimited use and unrestricted exposure.

II. Site Chronology

Table 1- Chronology of Site Events

Land operations conducted at the Site.	1943
Sand & gravel activities commence at the Site.	Prior to 1950
Close of Site operations.	7/1978
Final listing on U.S. EPA National Priorities List	9/8/1983
Remedial Investigation/Feasibility Study (RI/FS) conducted at the Site.	1983 to 1985
Proposed plan identifying U.S. EPA's preferred remedy for operable unit 1 presented to the public; start of public comment period.	8/12/85
ROD selecting an interim remedial action for imminent concerns (operable unit 1).	9/30/1985
Administrative Order on Consent (# 1) required the Wauconda Task Group to conduct a supplemental RI/FS and implement interim remedial measures.	6/1986
Proposed plan identifying U.S. EPA's preferred remedy for operable unit 2 presented to the public; start of public comment period.	5/2/88
Administrative Order on Consent (# 2) required Browning Ferris to conduct additional groundwater monitoring, residential well survey, and continued maintenance of interim remedial measures.	9/1988
Final ROD issued by U.S. EPA addressing overall Site issues.	3/31/1989
Unilateral Administrative Order (# 3) required the Wauconda Task Group to implement the final ROD.	12/1989
PRP Remedial Design approved by U.S. EPA.	9/30/1991
Start of mobilization and on-Site construction activities for implementation of interim remedial activities (date that triggers a five- year review).	5/5/1992
Consent Decree required reimbursement of past response costs.	4/20/1994
Pre-final inspection of remedial action.	9/27/1994
Certified Completion of on-Site construction and remedial action activities.	8/2/1996
Preliminary Close-out Report signed.	8/22/1996
Remedial Action Report submitted by responsible party.	4/7/1997
O & M Plan approved by U.S. EPA.	5/30/1997
Five Year Review	5/1997
Last Site Inspection	4/16/2002

III. Background

Physical Characteristics

The Wauconda Sand & Gravel Landfill Superfund Site is located in Lake County, Illinois, north of the Village of Wauconda. The Wauconda Sand & Gravel Landfill consists of approximately 74 acres of property with 53 acres making up the landfill and nearly 6 acres of the landfill operated under a State permit. The remaining 47 acres of the landfill pre-dated the permitting process and, therefore, did not operate under a State permit. The area surrounding the Site is comprised of residential, agricultural and light industrial properties. Bordering the Site on the north is Mutton Creek. On the south, the Site is bordered by Bonner Road; and, on the east, the Site is bordered by Garland Road. (See Attachment 1.)

Land and Resource Use

The historic land use of the Site involved sand and gravel pit operations, landfill activities, and recreational activities such as rifle practice, model plane flying, and snow mobiling. The Site was used as a sand and gravel pit prior to 1950. In 1950, Wauconda Sand & Gravel Company was incorporated and began landfill operations at the Site. Both the permitted and unpermitted portions of the Site were closed in 1978, and a clayey loam soil was placed on the top of the landfill.

The current land use for the surrounding area is residential, light industrial, and agricultural. It is anticipated that a mix of land uses similar to that described above will continue near the Site in the future. Presently, two large housing developments near the Site are in the planning stages. If constructed, these developments would be located within 1 or 2 miles of the Site in a northeast direction. In establishing cleanup requirements for the Site, U.S. EPA considered the existing residential development near the Site. The Site itself is currently fenced and the contamination remains contained within the fenced area under a soil cap.

There are five distinct stratigraphic units which underlie the Site. These stratigraphic units are as follows:

- ♦ an upper fine grained unit;
- ♦ an upper aquifer unit;
- ♦ a middle clay aquitard;
- ♦ a lower aquifer;
- ♦ a dolomite bedrock unit.

The groundwater flow in the lower aquifer is to the southwest. The upper fine grain unit is encountered at ground surface and ranges in thickness from 20 to 65 feet. The upper aquifer is encountered at elevations ranging between 770 to 710 feet above mean sea level, and ranges in thickness from 40 to 170 feet. The middle clay aquitard is found at elevations ranging from 700 to 690 feet above mean sea level, and ranges in thickness from 0 to 85 feet. (At groundwater monitoring location OW418, the middle clay aquitard does not exist and the upper and lower aquifers form one unit. This condition only exists at monitoring well location OW418 and is not observed at the nearby groundwater monitoring well locations.) The lower aquifer, used as a drinking water source, ranges in thickness from 5 to 15 feet and is present from 630 to 620 feet above mean sea level. The dolomite bedrock unit is encountered at elevations ranging from 605 to 595 feet above mean sea level.

History of Contamination

During the sand & gravel pit operations, a gravel pit, which covered a major portion of the present Site, was excavated to an estimated depth of 730 feet above sea level, which is about 40 feet below the shallow aquifer groundwater table and 40 to 80 feet below adjacent ground surface contours. There is an estimated 5.4 million cubic yards of waste material contained in the 43 acre unpermitted landfill. Once landfill operations began at the Site, the mined-out gravel pit was filled with refuse including residential garbage, construction debris, and industrial wastes and sludges. Soil borings made at the landfill perimeter, geophysical test results, and Illinois EPA reports indicated that waste materials were deposited in the landfill at the 730 feet elevation. As well, Illinois EPA sampled a private well adjacent to the eastern boundary of the landfill and concluded that the well sample contained organic, inorganic, and poly-chlorobiphenyl contamination. Monitoring and sampling of additional wells surrounding the landfill and Mutton Creek showed that nearby groundwater sources were contaminated by organics, polychlorinated biphenyls, and metals. In subsequent sampling events, polychlorinated biphenyls were not detected.

Initial Response

As discussed above, groundwater and surface water sampling showed that the water quality of Mutton Creek was impacted by leachate releases from the Site. U.S. EPA received an anonymous report that polychlorinated biphenyls were disposed at the Site. Consequently, the site was proposed for the National Priorities List in July 1982. The Site was listed on the final National Priorities list on September 8, 1983, (48 Federal Register 40658).

Between 1983 and 1985, the Remedial Investigation/Feasibility Study for the site was conducted. Initially, the Site was divided into two operable units. Operable unit 1 addressed the imminent concerns of the Site through the interim Record of Decision

(ROD). Operable unit 2 addressed the overall Site actions through the final ROD. Both RODs are discussed in more detail in the Remedial Actions section below.

Basis for Taking Action

Contaminants

Residential homes and groundwater monitoring wells were sampled during the first phase of the remedial investigation. Hazardous substances from the landfill were detected in the groundwater above the Federal and/or State drinking water standards included the following: nickel, lead, chromium, cadmium, benzene, silver, cyanide, vinyl chloride, arsenic, N-nitrosodiphenylame, tetrachlorethene, bis (2 chloroethyl) ether.

IV. Remedial Actions

Remedy Selection

The interim ROD for operable unit 1 for the Wauconda Sand & Gravel Landfill Superfund Site was signed on September 30, 1985. Interim remedial action objectives were developed as a result of data collected during the remedial investigation to aid in the development and screening of remedial alternatives to be considered for the ROD. The remedial action objectives for the Site were as described below:

Source Control Response Objectives

- Reduce risks to human health by preventing direct contact with, and ingestion of, contaminants in the property soils, and by preventing potential ingestion of contaminated groundwater;
- Reduce risks to the environment by preventing direct contact with, and ingestion of, contaminants on the property;
- Minimize the migration of contaminants from property soils that could result in surface water concentrations in excess of water quality standards;
- Reduce the potential of human health risks by eliminating the direct contact exposure route by installation of the perimeter fence.

These objectives were accomplished by the following interim remedial actions:

- the installation of a leachate collection system to prevent contaminated leachate from reaching Mutton Creek;

- the installation of a perimeter fence to prevent access to the Site; and,
- the upgrade of the landfill cap.

Institutional controls were required for the Site. The objectives of the institutional controls included reducing risks to human health by preventing direct contact or exposure to contaminated groundwater by preventing use of the groundwater at the Site and restricting access to the Site. Once fully implemented, these institutional controls will be recorded in the Lake County recorder of deeds.

Remedy Implementation

An Administrative Order on Consent was signed with a group of the potentially responsible parties (PRPs) in July 1986 that required the PRPs to perform the interim remedial measures at the Site. The settling PRPs identified themselves as the Wauconda Task Group and performed the following interim measures: additional groundwater investigations; installation of a leachate collection system to stop leachate releases to Mutton Creek; installation of a fence to restrict Site access and to prevent direct contact; repairs and upgrades including revegetation to portions of the landfill cover to reduce infiltration and promote runoff.

In September 1988, U.S. EPA issued an Administrative Order on Consent to Browing Ferris Industries, another PRP. This Administrative Order required Browing Ferris industries to conduct additional groundwater investigations, conduct a residential well survey, and continue maintenance of the interim remedial measures completed by the Wauconda Task Group under the earlier order.

After the U.S. EPA issued the final ROD for the Site on March 31, 1989, a Unilateral Administrative Order was issued on December 19, 1989, which ordered the PRPs to conduct the remedial design and remedial action selected in the final ROD. In January 1990, the WTG agreed to comply with the requirements of the Unilateral Administrative Order and to conduct the final remedy in conformance with the final ROD. The components of the final ROD included the following:

- restricted use of on-Site groundwater;
- upgrade the existing cap;
- landfill gas management;
- continued maintenance of the interim remedial measures;
- monitoring well network upgrade;
- groundwater monitoring;
- surface water monitoring in Mutton Creek (in the event of a leachate overflow);
- leachate monitoring (in the event of a leachate overflow).

In April 1991, the WTG submitted a remedial design/remedial action workplan for the Site. The final remedial design was completed in conformance with the ROD and approved on September 30, 1991. The remedial action activities began with the contractor mobilization in May 1992.

In 1992, the landfill cap was upgraded to eliminate ponding areas, provide erosion protection within swales and to ensure a minimum cap thickness of 2 feet. A 6-inch topsoil layer was added in areas of the landfill that had an insufficient cover. The original leachate collection system was installed in 1987 along the northern boundary of the Site to intercept or prevent subsurface leachate seeps from reaching Mutton Creek. This leachate collection system was modified in 1992 by connecting the two collection sumps and constructing a forcemain which allowed collected leachate to be discharged to the Village of Wauconda sanitary sewer system. A perimeter fence was constructed around the Site as an interim measure in 1987 and subsequently replaced or upgraded as needed. Passive vents were installed in two phases. The first phase included the installation of 10 passive vents in the interior portion of the landfill in 1992. The second phase included the installation of 8 passive vents along the Site perimeter in 1994. Groundwater monitoring wells were installed as part of this remedial action. Nineteen groundwater monitoring wells were included in the Site monitoring network. Four wells were identified as lower aquifer wells and 9 wells were identified as upper aquifer wells. Groundwater monitoring wells OW412, OW413, OW414, and OW416 were installed in August 1991 and were screened in the upper aquifer. Groundwater monitoring well OW417 was installed in August 1991 and screened in the lower aquifer. Other groundwater monitoring wells were screened in the upper aquifer and installed in May 1985 were as follows: OW404/ OW 405; OW406; OW407; and, OW408. Lower aquifer monitoring wells G311B, OW409, and OW410 were installed in November 1983, September 1986, and October 1986, respectively.

The Preliminary Closeout Report was signed by U.S. EPA on August 22, 1996, which documented the completion of the Sitewide remedial action.

U.S. EPA and the State have determined that all remedial action construction activities were performed according to specifications. It is expected that the cleanup levels for all groundwater contaminants will be reached 30 years after the start of the remedial action. After groundwater cleanup levels have been met, U.S. EPA will issue a Final Close Out Report.

System Operation/Operation and Maintenance

The Wauconda Task Group submitted an O&M plan to U.S. EPA in April 1991. A revised O&M plan was submitted to U.S. EPA for approval in August 1996.

Presently, the Wauconda Task Group conducts operations and maintenance activities at the Site in accordance with the revised plan that was approved by U.S. EPA on September 8, 1998. The O&M plan included long term operations and maintenance activities for the leachate collection system, landfill cap, perimeter fence, monitoring wells, passive gas vents, inspection procedures for the landfill cap, and animal control. The primary activities associated with the Site O&M plan include the following:

- ✧ Site inspections and reporting to U.S. EPA and the State
  - ✧ Visual inspection of the cap including the vegetative cover, settlement, stability, and any need for corrective action. In addition, the cap is scheduled to be mowed periodically.
  - ✧ Inspection of the drainage swales for blockage, erosion and instability, and any need for corrective action.
  - ✧ Inspection of the condition of groundwater monitoring wells.
  - ✧ Inspection of the leachate collection system for leachate flow monitoring and operational conditions of the system; recording of leachate flow rates 3 times per week and system parameters; removal of accumulated solids and precipitates from the line and sumps; off-Site disposal of collected solids.
- ✧ Environmental monitoring and sampling
  - ✧ Annual sampling of groundwater monitoring wells; annual sampling of 5 residential wells; monthly sampling of the Hedgepath well;
  - ✧ Quarterly sampling of the leachate collection system as part of the State permit requirements.

Primary O&M costs for the Site include landfill cap maintenance, residential well sampling, groundwater monitoring well sampling, monitoring well maintenance, leachate collection system operation, leachate collection system maintenance, leachate control system sampling, animal control, and landfill gas management. The ROD estimated annual O&M costs at $175,000. Current annual O&M costs are estimated at $185,000 to $225,000. Other costs relating to managing the Site include technical and legal support increase annual Site costs to range between $250,000 and $300,000.

V. Progress Since the Last Five Year Review

Since the last five-year review, the Site continued to operate in accordance with the ROD and the administrative orders. The protectiveness statement from the last review stated that the remedies selected for this Site remained protective of human health and the environment. The recommendations cited in the last five-year review stated that the Wauconda Task Group should continue operation and maintenance of the landfill cap, the gas management system, the leachate collection system, and the monitoring well network until the achievement of cleanup standards. The last five-year review also recommended that U.S. EPA evaluate proposals to further upgrade the northern landfill slope and/or leachate colletion system if submitted. These recommendations were followed. Operation and maintenance of the landfill cap, gas and leachate systems, and monitoring well network have continued at the Site. Proposals were submitted by the Wauconda Task Group to upgrade the leachate collection system in 1997. The proposed measures were implemented and improved results were noted as the amount of leachate generated reduced at the Site. A proposal was submitted in February 1998 to address additional buried waste discovered at the Site, during the installation of gas probes in September 1994. From the summer of 1998 and through the fall of 1999, the Wauconda Task Group implemented, among other activities, measures to cover the additional buried waste at the Site. These activities consisted of the following: placement and grading of a clay cover over the additional buried waste; placement and seeding of topsoil, and relocation of the perimeter fence along the east side of the landfill in the area of the former recycling center and the auto salvage yard. Also, an area near the northeast side of the landfill eroded and prevented positive drainage at the Site. The Wauconda Task Group performed activities to reshape and redirect the swale so that positive drainage could occur at the Site. Due to erosion, additional clay and topsoil were placed along the west slope of the Site. The west access road at the Site was upgraded from clay to gravel to allow greater accessibility to the leachate collection system forcemain cleanout areas.

In May 19, 1999, the Wauconda Task Group submitted an interim water supply plan due to exceedances of the action level for vinyl chloride (1.0 ug/L) at the residential monitoring well located at the Hedgepath property located at 1207 Garland Road. The interim plan consisted of additional sampling of the residential well and the PRPs supplying bottled water to the residents of the Hedgepath property until the concentration of vinyl chloride in the residential well no longer exceeded the action level. U.S. EPA approved this plan since the maximum contaminant level of 2.0 ug/L was not exceeded for the residential well.

VI. Five-Year Review Process

Administrative Components

The Wauconda Sand & Gravel Five-Year Review team was led by Lolita Hill of U.S. EPA, Remedial Project Manager for the Wauconda Sand & Gravel Superfund Site.

Also, Mike Joyce of U.S. EPA, the Community Involvement coordinator, Mick Hans of the U.S. EPA Public Affairs, and Roger Grimes, of the Office of Regional Counsel, participated in the Five Year Review process. Eric Runkel of the Illinois Environmental Protection Agency assisted in the review as the representative for the support agency.

From November 2001 to May 2002, the review team established and followed the review schedule as follows:

- Document Review;
- Data Review;
- Community Involvement ;
- Local Interviews;
- Site Inspection;
- Five-Year Review Report Development and Review

The public was notified of the five-year review in March and April 2002 through local news media as detailed below.

Community Involvement

The Community Involvement Coordinator and the Remedial Project Manager conducted interviews with local newspapers concerning the Site and the initiation of the five-year review. The public was notified of the five-year review on March 14, 2002, through a newspaper article, written by Kate Grusich, in the Daily Herald, a newspaper widely distributed in Lake County which includes the Wauconda, Illinois area. Additionally, notice was given to the public through the Chicago Tribune newspaper in an article written by Sean D. Hamill on April 11, 2002. The review team members conducted telephone conferences with residents of the Wauconda community to discuss the Site as it relates to the proposed redevelopment of the Wauconda community.

Document Review

This five-year review consisted of a review of relevant documents including O&M records, inspection reports, groundwater monitoring results, and leachate sampling

results. (See Attachment 1). Applicable groundwater cleanup standards and performance standards for the remedy were reviewed. The major groundwater performance standards are as shown below:

- The concentration of hazardous substances in the groundwater beyond the Site borders should not exceed Federal Maximum Contaminant Levels or other health based criteria;
- Action levels for residential wells were one-half the Primary Drinking Water Standard (40 C.F.R. 141);
- Action levels for chloride, sodium, and cyanide were established at 200 mg/L, 100 mg/L, and 0.022 mg/L, respectively;
- Action levels for monitoring wells with exceedances of a Primary Drinking Water Standard as defined in 40 C.F.R. 141 or an exceedance of the cumulative carcinogenic risk levels (excluding arsenic and vinyl chloride) for a lifetime drinking water supply of $1x10^{-5}$.

Data Review

Groundwater Monitoring

Groundwater sampling has been conducted at the Site since the early 1980s. In general, most contaminants were detected at their highest levels early in the remedial history of the Site. This high level followed by a drop in contaminant levels can be attributed to the landfill cap upgrade and the installation and operation of the leachate control system.

Collected groundwater samples were analyzed for volatile organic compounds (VOCs), metals, and general water quality parameters. Filtered and unfiltered samples were collected from the upper aquifer monitoring wells during sampling events. Unfiltered samples were collected from the lower aquifer.

Overall, the groundwater quaility at the Site is consistent with historical sampling results. Sampling results do not indicate a development or migration of a hazardous substance plume. Some excursions of the MCLs for a few contaminants were observed in the lower aquifer at groundwater monitoring well OW410 and in the upper aquifer at groundwater monitoring wells OW412, OW413, OW416, OW420, and G305B. Antimony was detected slightly above its MCL at monitoring well OW410 once during this five-year review period. Arsenic was detected at levels above its MCL at monitoring well OW413 but has shown a downward trend since 1997. Benzene was

detected slightly above its MCL at monitoring well OW413 and has shown a downward trend throughout this five-year review period. Tetrachloroethene was detected slightly above its MCL once in 1998 at monitoring well OW416. Thallium was detected slightly above its MCL in 1998 at monitoring well OW420. Vinyl chloride was detected at 4 upper aquifer groundwater monitoring wells during this five-year review period. There appears to be a downward trend of the vinyl chloride concentrations detected at these groundwater monitoring wells. Refer to Table 2 below for more detail on these sampling events.

Table 2. Groundwater Sampling Results

Contaminant	Well Number	MCL (ug/L)	Concentration (ug/L)				
			1997	1998	1999	2000	2001
Antimony	OW410	6					6.2 uf
Arsenic	OW413	50	101uf	96.4 uf	81.9 uf	70.5 uf	67.8 uf
	OW413	50	101 f	91.1 f	85.6 uf	71.3 uf	63.9 uf
	OW413	50	109 uf	96.4 uf	89.0 f		55.7 uf
	OW413	50	112 f	85.3 f			59.4 f
Benzene	OW413	5	6 uf	6.8 uf	5.4 uf	5.9 uf	5.4 uf
Tetrachloroethene	OW416	5		7.4 uf			
Thallium	OW420	2		2.2 uf			
Vinyl Chloride	OW412	2	2.1 uf			6.6 uf	8.5 uf
	OW416	2	2.1 uf		2.0 uf	2.3 uf	2.1 uf
	OW420	2	15 uf	11.0 uf	6.2 uf	9.3 uf	5.8 uf
	G305B	2		2.2 uf	2.1uf	2.4 uf	2.1 uf

uf - indicates unfiltered
f - indicates filtered

In August and September 1997, the Stanek residential monitoring well G216 exceeded the action levels of sodium (100 mg/L) and chloride (200 mg/L). Sodium concentrations were 129 mg/L and 133 mg/L. Chloride concentrations were 250 mg/L and 270 mg/L. The Covers residential monitoring well, G226, exceeded the vinyl chloride action level (1.0 ug/L) for the unfiltered samples in February, April, and August 1997. Vinyl chloride concentrations at the Covers residential monitoring well ranged between 1.1 and 2.2 ug/L. Since these groundwater sampling events, the Stanek and Covers residences were not used as potable water sources. These residences were connected to the Village of Wauconda water system.

Action levels were exceeded for chloride, sodium, and vinyl chloride in residential wells. The action level for sodium was exceeded at residential well G224 (Hedgepath) in 1998, well G264 (Coulter) in 1999, well G291(Cicerello) in 1999 and well #54 (Thomas) in 2000. Sodium concentrations ranged between 108 and 328 mg/L. The action level for chloride was exceeded at well G291 in 1998 and 1999, well G264 in 1999 and 2000, and well #54 in 2000. Chloride concentrations ranged between 232 to 280 mg/L. The vinyl chloride action level (1.0 ug/L) was exceeded at residential well G224 from 1997 to 2001. The vinyl chloride concentrations at well G224 ranged between 1.1 and 2.0 ug/L. Presently, residential well G224 is not used for residential purposes.

The groundwater risk assessment was calculated for all the residential wells. The risk assessment determined that the total excess cancer risk is less than the action level of 1×10^{-5}.

Site Inspection

An inspection at the Site was conducted on March 21, 2002, by the Remedial Project Manager, the Community Involvement Coordinator, and Conestoga Rovers & Associates, the PRP group contractor. The purpose of the inspection was to assess the protectiveness of the remedy, including the integrity of the landfill cap and other remedy components, and to discuss the proposed redevelopment issues in Wauconda, Illinois.

During the March 2002 inspection, there were no major issues noted related to the landfill cap, the leachate control system, the drainage structures, the landfill gas management system, or the fence. Minor erosion of the landfill cap was observed.

On April 16, 2002, Illinois EPA conducted a Site inspection. The inspector observed bulging on the north portion of the landfill cap at the end of swale #4. The inspector noted that Mutton Creek may be eventually impacted and the fencing in the area may collapse if the bulging continues. Also, the inspector noted ponding on the eastern section of the landfill around the sediment trap near the midpoint of swale #1.

Per the Unilateral Administrative Order, institutional controls for the Site were required to be implemented for the Site. Such controls included prohibitions on the use or disturbance of groundwater, disturbance of the cap, and any other activities or actions that might interfere with the implemented remedy. A fence was installed to restrict access to the landfill property and to prevent interference with the remedy. Deed restrictions which limited the use of groundwater for the Site were not put in place. Although the deed restrictions have not been implemented, there were no observed activities that would have violated the intended purposes of the institutional

controls or deed restrictions. The cap and the surrounding area were undisturbed, and no new uses of groundwater were observed.

Activities are ongoing for the transfer of the property to a new owner. A property transfer agreement has been drafted for the existing owner, Wauconda Sand & Gravel Incorporated, and the new Site owner. This agreement requires the new owner to implement and maintain the deed restrictions and institutional controls for the Site as required by the Unilateral Administrative Order. The property transfer agreement also requires the new owner to notify the Wauconda Task Group and the U.S. EPA of all changes to the Site, and to obtain approval, prior to implementing any changes. The property transfer agreement and the sale of the Site are expected to be finalized by December 2002. Deed restrictions for the Site should be in place by the end of 2002 as well and will be filed in Lake County.

Interviews

As discussed above, the review team had telephone discussions with citizens who resided near the Site. Some of these residents included Mr. Agrella, Ms. Frieze, and Ms. Hample. The residents were concerned because the Village of Wauconda proposed to implement a project that would include the development of 1,000 new homes in Wauconda, Illinois. The proposed plan would include the installation of 2 new municipal wells to service the new housing development. Many citizens were concerned about the growth of their community while other residents were concerned primarily about the possibility of the Site adversely impacting their community due to the operation of the new municipal wells.

During the March 21, 2002, inspection, U.S. EPA interviewed Mr. Dirker, the Wauconda Village Administrator. Mr. Dirker was involved in the development project and was aware of the citizens' concerns. Mr. Dirker stated that the exact well locations were not finalized and that additional studies were underway to ensure that the new wells would not adversely impact the landfill or the Wauconda community. Mr. Dirker agreed to distribute to U.S. EPA design documents and plans relevant to the installation of these 2 new municipal wells.

Concerning the actual remedy at the Site, none of the residents were able to identify any problems with the remedy or any emergency responses at the Site since the last five-year review or since the implementation of the remedy.

VII. Technical Assessment

Question A: Is the remedy functioning as intended by the decision documents?

The review of documents, ARARs, risk assumptions, and the results of the Site inspection indicate that the remedy is functioning as intended by the Site RODs. The

installation of the leachate control system, gas management system, and upgrading the landfill cap have achieved the remedial objectives to minimize the migration of contaminants to groundwater, to minimize the migration of contaminants to surface water, and to prevent direct contact with, or ingestion of, contaminants in soil and sediments. The installation of the Site fence has prevented exposure to, or ingestion of, contaminated groundwater.

Operation and maintenance of the leachate control system, gas management system, animal control program, and the landfill cap maintenance program have been effective. Equipment repairs or replacements to remedial systems were made as necessary and identified to the U.S EPA. Annual O&M costs are consistent with anticipated cost estimates and there are no indications of any difficulties with the remedy.

There were no opportunities for system optimization observed during this review. The monitoring well network provides sufficient data to assess the progress of the remedy at the Site. There are no concerns that a plume may be migrating down gradient toward the Mutton Creek. Maintenance of the landfill cap is sufficient to maintain the overall structural integrity of the cap. Ponding, however, must be addressed near the eastern section of the landfill around the sediment trap, near the midpoint of swale #1. Bulging must be addressed along the northern portion of the landfill near swale #4.

The institutional controls that will be implemented for the Site this year include prohibitions on the use or disturbance of groundwater at the Site and prohibitions on disturbances of the landfill cap, and any other activities or actions that might interfere with the implemented remedy. No activities were observed that would have violated the intent of these institutional controls. The cap and the surrounding area were undisturbed. There were no new uses of groundwater observed at the Site. The fence around the site is intact and in good condition.

Question B: Are the exposure assumptions, toxicity data, cleanup levels, and remedial action objectives used at the time of the remedy selection still valid?

There have been no changes in the physical conditions of the Site that would affect the protectiveness of the remedy.

Changes in Standards and Things To Be Considered

As the remedial work has been completed, most ARARs or performance standards cited in the ROD have been met. ARARs that still must be met at this time and that have been evaluated include: the Safe Drinking Water Act (40 FR

141.11-141.16) from which many of the groundwater cleanup levels were derived - Maximum Contaminant Levels (MCLs). There have been no changes in these ARARs and no new standards affecting the protectiveness of the remedy.

Changes in Exposure Pathways, Toxicity, and Other Contaminant Characteristics

The exposure assumptions used to develop the Human Health Risk Assessment included both current exposures (older child trespasser, adult trespasser) and potential future exposures (young and older future child resident, future adult resident and future adult worker). There have been no changes in the toxicity factors for the contaminants of concern that were used in the baseline risk assessment. These assumptions are considered to be conservative and reasonable in evaluating risk and developing risk-based cleanup levels. No change to these assumptions, or the cleanup levels developed from them is warranted. There has been no change to the standardized risk assessment methodology that could affect the protectiveness of the remedy. The remedy is progressing as expected and it is expected that all groundwater goals will be maintained in the future should the Site conditions and surroundings remain constant.

Question C: Has any other information come to light that could call into question the protectiveness of the remedy?

No ecological targets were identified during the baseline risk assessment and none were identified during the five-year review. Therefore monitoring of ecological targets is not necessary. There were no weather-related events have affected the protectiveness of the remedy. There is no other information that calls into question the protectiveness of the remedy.

Technical Assessment Summary

According to the data reviewed, the Site inspections, and the interviews, the remedy is functioning as intended by the final ROD. There have been no changes in the physical conditions of the Site that would affect the protectiveness of the remedy. Many of the ARARs or performance standards for the Site, as described in the ROD, have been met. There are some performance standards that have not been achieved. There have been no changes in the toxicity factors for the contaminants of concern that were used in the baseline risk assessment, and there have been no changes to the standardized risk assessment methodology that could affect the protectiveness of the remedy. There is no other information that calls into question the protectiveness of the remedy.

VIII. Issues

Some contaminants such as vinyl chloride, benzene, chloride, and sodium have slightly exceeded the maximum contaminant levels or the action level at a few groundwater monitoring wells or residential wells. These exceedances have occurred in the upper aquifer. However, at this time, these exceedances do not appear to affect the protectiveness of the remedy since there is a downward trend in the contaminant concentrations.

Table 3. Issues

Issue	Currently Affects Protectiveness (Yes/No)	Affects Future Protectiveness (Yes/No**)**
Some contaminants exceeded the MCLs.	No	No

IX. Recommendations and Follow-Up Actions

With a few exceptions, the performance standards for the Site have been achieved. Therefore, the recommendation resulting from this five year review would be to continue operation and/or maintenance of the remedy components until all performance standards are achieved as shown in Table 4 below.

Table 4. Recommendations and Follow-Up Actions

Issue	**Recommendations Follow-up Actions**	**Party Responsible**	**Oversight Agency**	**Milestone Date**	**Affects Protectiveness? (Yes/No)**	
					Current	Future
Landfill cap	Continue to perform landfill cap inspections; perform landfill cap upgrades as necessary; and submit reports.	Wauconda Task Group	State, U.S.EPA	12/2020	No	No
Groundwater monitoring	Continue to collect and analyze ground-water samples; conduct operations and maintenance related activities; and submit monthly and annual reports.	Wauconda Task Group	State, U.S. EPA	12/2020	No	No

Table 4. Recommendations and Follow-Up Actions (continued)

Issue	Recommendations Follow-up Actions	Party Responsible	Oversight Agency	Milestone Date	Affects Protectiveness? (Yes/No)	
Leachate control system	Continue to perform operations and maintenance related activities; continue to conduct leachate system inspections, sampling, and reporting.	Wauconda Task Group	State, U.S.EPA	12/2020	No	No
Gas control management system	Continue to perform operations and maintenance related activities.	Wauconda Task Group	State, U.S. EPA	12/2020	No	No
Deed restrictions	Site deed restrictions should be filed and set in place.	Site Owner	Wauconda Task Group, State, U.S.EPA	12/2002	No	No
Proposed installation of new municipal wells in the area	Conduct additional investigations of the proposed municipal well installations, proposed locations, and the impact on the Site.	Wauconda Task Group, State, U.S. EPA	State, U.S.EPA	06/30/2002	No	To Be Determined

X. Protectiveness Statement

The remedy is expected to be protective of human health and the environment upon attainment of groundwater cleanup goals which is expected to require 30 years to achieve. In the interim, exposure pathways that could result in unacceptable risks are being controlled preventing exposure to, or the ingestion of, contaminated groundwater. All threats at the Site have been addressed through upgrading the landfill cap, the installation and operation of a leachate control system, operation of a gas management system, fencing to prevent access to the Site. Site deed restrictions will be implemented and will aid in restricting exposure pathways and threats.

Long-term protectiveness of the remedial action will be verified by obtaining additional groundwater samples to fully evaluate potential migration of contaminants down gradient from the Site and towards Mutton Creek. Monitoring of the leachate will be a component in ensuring the long-term protectiveness of this remedy. Current data indicate that a plume had not migrated off-Site. Sampling and analysis will be continued on a quarterly basis. Current monitoring data indicate that the remedy is functioning as required to achieve groundwater goals.

XI. Next Review

The next five-year review for the Wauconda Sand & Gravel Landfill Superfund Site is required by May 31, 2007, five years from this review.

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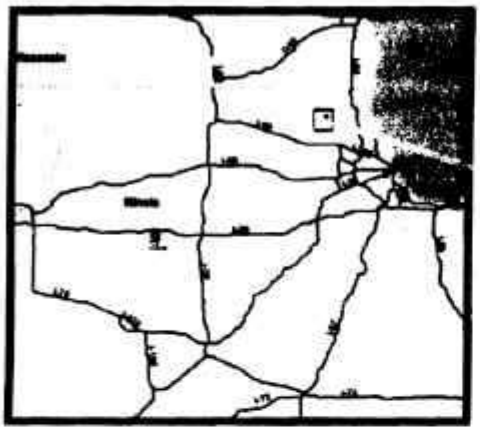
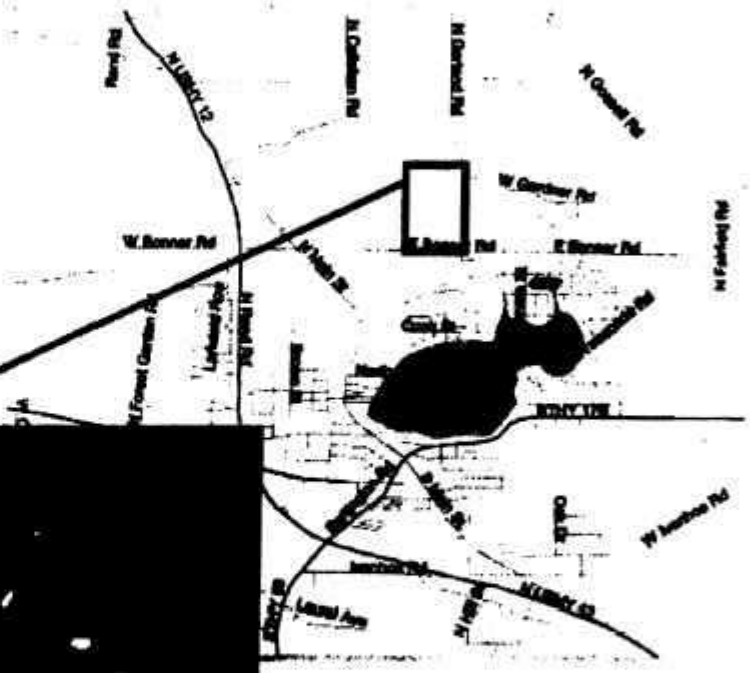
Location of Wauconda Sand & Gravel Superfund Site Wauconda, Illinois

1) State of Illinois



2) City of Wauconda



3) Wauconda Sand & Gravel Site

Figure 1

Plot Created by U.S. EPA, Region 5 7/30/02

EPA

3D Land Surface Terrain Model

Wauconda Sand & Gravel Superfund Site

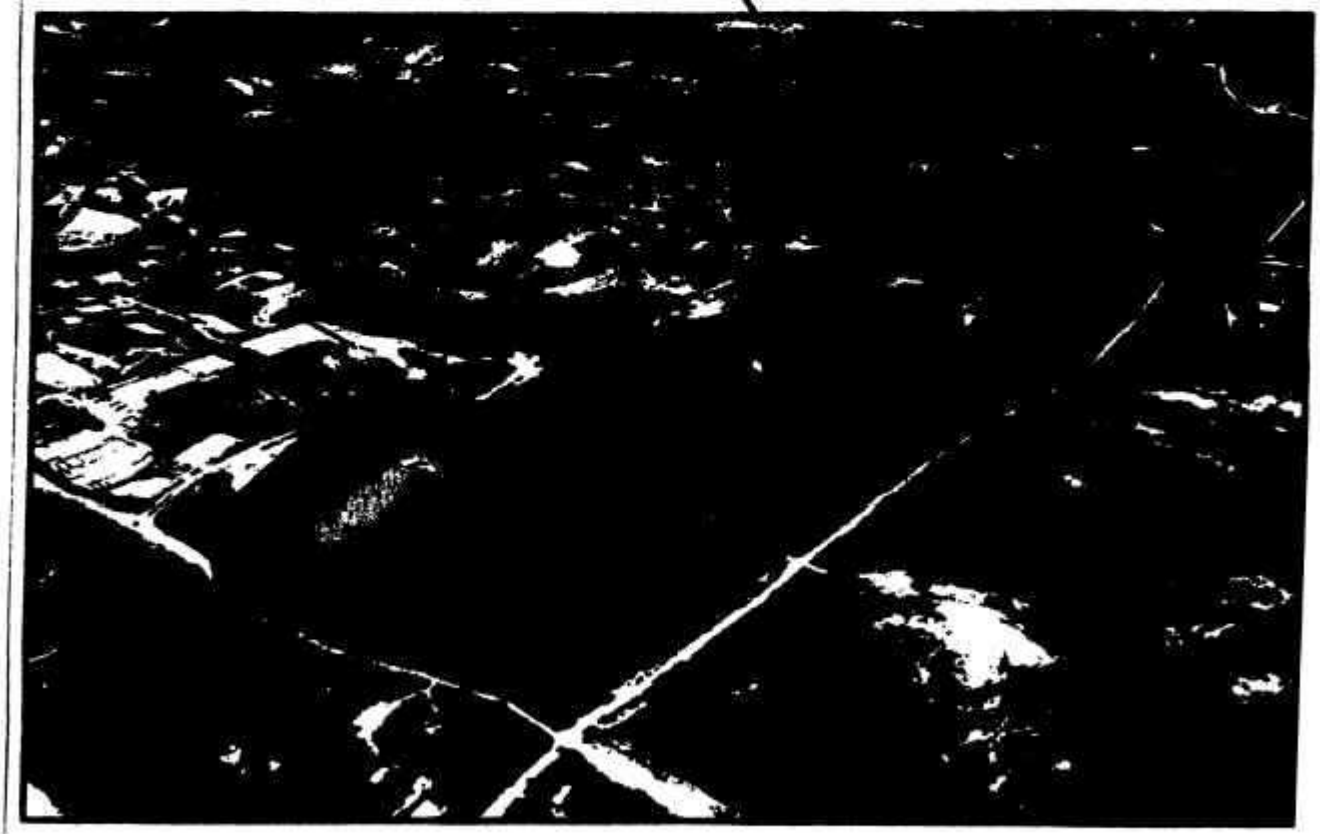


Figure 2

Plot Created by U.S. EPA, Region 5
7/30/02 - Vertical Exaggeration = 3 X